

School-Based Nutrition Education as a Community Engagement Program to Enhance Adolescents' Awareness of Sugar, Salt, and Fat Intake in Banyuwangi

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ABSTRAK

Excessive consumption of sugar, salt, and fat among adolescents remains a public health particularly related to low nutritional literacy and limited understanding among students regarding safe limits for sugar, salt, and fat (SSF) consumption. The Youth Red Cross (PMR) as part of the school community has strategic potential as a partner and promoter of peer health, but still needs capacity building in nutrition education. To address this issue, school-based nutrition education activities are implemented as a community engagement program with the aim of increasing students' knowledge, awareness, and involvement in promoting healthier consumption of SSF. The activity involved 150 Youth Red Cross (PMR) students from five senior and vocational high schools in Banyuwangi Regency. Teachers and PMR members were actively engaged as community partners in planning, facilitating, and supporting the implementation of the program. Educational activities were delivered through interactive discussions, the use of familiar food examples, reflective group sessions, and basic health screening to connect nutrition messages with students' real-life conditions. Program outcomes were documented as part of routine activity evaluation using a 10-item questionnaire administered before and after the sessions. An increase in average scores was observed, indicating improved short-term understanding; however, the primary contribution of the program lies in enhanced student engagement, peer interaction, and awareness of healthier dietary choices. The activity also encouraged reflection and dialogue within the school environment, suggesting positive social impact beyond individual knowledge gains. Overall, this community-based initiative demonstrates a feasible and empowering model for integrating nutrition education into routine school health activities.

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1. PENDAHULUAN

Adolescent nutrition is a serious public health issue both globally and in Indonesia, along with the increasing prevalence of overweight, obesity, and non-communicable diseases closely related to unhealthy eating patterns [1]. The World Health Organization (WHO) reports that in 2022, more than 390 million children and adolescents aged 5–19 years were overweight, including approximately 160 million who were obese [2]. This condition is also reflected in Indonesia, where the prevalence of overweight and obesity reaches 20% in school-age children and 14.8% in adolescents [3]. One of the main factors contributing to this problem is the high consumption of sugar, salt, and fat (SSF) exceeding the recommended intake. National data shows that 53.1% of adolescents consume excessive amounts of sugar, 26.2% consume excessive amounts of salt, and 40.7% consume excessive amounts of fat [4][5][6]. This consumption pattern is increasingly worrying among

adolescents living in urban areas, who have high access to ultra-processed foods and beverages and tend to have low levels of physical activity [7]. The habit of consuming foods high in sugar, salt, and fat such as packaged sweet drinks, fried snacks, and fast food if continued from school age, has the potential to increase the risk of nutritional disorders, obesity, and non-communicable diseases in adulthood. This condition emphasizes the importance of prevention efforts starting from school age through increased awareness and nutritional literacy among adolescents.

The Indonesian Health Survey shows that more than half of school students have inadequate levels of physical activity, reflecting unhealthy lifestyle patterns among adolescents [8,9]. This condition is inseparable from low nutritional literacy among adolescents, especially in understanding the safe limits for sugar, salt, and fat (SSF) consumption and the ability to identify hidden sources of SSF in everyday foods and beverages. Many adolescents are unaware that their consumption of sugary drinks or certain snacks exceeds the daily recommendations, potentially leading to unhealthy food choices and low compliance with balanced nutrition guidelines [10,11,12]. This low nutritional literacy also impacts adolescents' overall behavior and lifestyle, including low physical activity and a lack of awareness of the importance of adequate rest and stress management. In line with this, school-based health education is one effective approach to improving nutrition literacy among adolescents [13]. Interactive and participatory educational approaches have been shown to be more effective in improving students' knowledge, attitudes, and short-term dietary behavior intentions than conventional lecture methods [8,12,14]. However, most nutrition education programs that have been implemented are still short-term and lack systematic pre- and post-evaluations, thereby limiting the availability of evidence regarding the effectiveness and potential replicability of programs in school settings [10,15].

Schools are strategic environments for shaping healthy behaviors in adolescents because they provide a structured space for systematic and continuous health education and promotion. In the context of school-based health education, the Youth Red Cross (PMR) has been identified as a strategic target group due to its proximity to students and its role in health and humanitarian activities in the school environment. Initial observations show that PMR members still have limited understanding of the recommended intake levels of sugar, salt, and fat (SSF) and tend to underestimate their daily consumption of sweetened beverages and high-fat snacks [10,12,15]. Improving nutritional knowledge within the PMR organization is expected to not only provide individual benefits, but also strengthen the role of PMR as agents of change and peer health promoters who contribute to the dissemination of healthy nutrition information among adolescents. Therefore, a school-based nutrition education program was implemented to increase adolescents' knowledge and awareness of SSF consumption through an interactive educational approach combined with a pre-post study design. This study reports on the implementation process and short-term learning outcomes of the program as an effort to provide practical evidence regarding a youth nutrition promotion model that is feasible, applicable, and can be replicated and integrated into school-based health activities [1,8,13,15].

Educating teenagers about the limits of sugar, salt, and fat consumption is very relevant because it is one way to prevent non-communicable diseases in them and can trigger healthy living behaviors in teenagers. The purpose of this community service activity is to increase teenagers' awareness and knowledge about the importance of a healthy lifestyle, with a focus on healthy eating, physical activity, adequate rest, and stress management to improve the quality of life in teenagers.

2. METHOD

This community engagement program employed a one-group pre-post evaluation approach to document short-term changes in students' knowledge and attitudes following a school-based nutrition education activity on limiting SSF intake among adolescents in Banyuwangi Regency. The activity was conducted in collaboration with five urban secondary schools SMAN 1 Glagah, SMAN 1 Giri, SMAN 1 Banyuwangi, MAN

1 Banyuwangi, and SMKN 1 Banyuwangi which served as community partners in the implementation of the program. A total of 150 students participated in the activity. Participants were recruited using purposive sampling based on school location and the presence of active PMR members, who routinely engage in school health initiatives and played an important role in supporting program implementation. The involvement of PMR members and teachers was intended to strengthen student participation, facilitate peer interaction, and ensure that the activity aligned with existing school health programs.

The intervention consisted of a single interactive classroom session facilitated by the program team with support from teachers and PMR members. Educational activities included short presentations on recommended SSF intake, discussions of commonly consumed foods and beverages, and facilitated group discussions that encouraged students to reflect on their daily dietary habits. To enhance engagement and contextual understanding, basic health screening activities were integrated into the session. The program evaluation was conducted using a self-administered questionnaire consisting of 10 items to assess students' knowledge and attitudes regarding SSF consumption. The questionnaire was administered before and immediately after the intervention as part of the routine evaluation of activities. Statistical analysis was performed by comparing pre- and post-intervention scores using a paired t-test at a significance level of $p < 0.05$. This analysis was evaluative and descriptive in nature, used solely to document short-term changes in participants' knowledge and attitudes, and was not intended to draw inferential conclusions about causal relationships or long-term behavioral changes.

This activity is part of the routine evaluation of school-based community service programs and does not involve medical intervention or the collection of sensitive data. Data is collected anonymously and used only for program evaluation purposes. Therefore, formal ethical approval from an ethics committee is not required. However, all participants participated voluntarily and received an explanation of the purpose and procedures of the activity prior to implementation.

3. RESULT & DISCUSSION

Community service activities in the form of education on sugar, salt, and fat restriction were carried out on October 24, November 1, 7, 12, and 13, 2025. These activities were held at five schools, namely SMAN 1 Giri Banyuwangi, MAN 1 Banyuwangi, SMAN 1 Glagah Banyuwangi, SMAN 1 Banyuwangi, and SMKN 1 Banyuwangi, with a total of 150 students participating. The name of this community engagement program is HEBAT "Hidup Sehat, Bugar, dan Tangguh" which is packaged in an attractive way. The activity began with an explanation of the pillars of health, namely healthy food consumption such as limiting sugar, salt, and fat, physical activity, and stress management. Next, there were interactive games such as quizzes, cheer challenges, and move more games. Additionally, pre-tests and post-tests were conducted to assess participants' knowledge before and after the activity, and the program concluded with Body Mass Index (BMI) measurements for the students as an initial screening or to determine their ideal body weight.

All 150 participants completed both the pre- and post-intervention questionnaires as part of routine program evaluation. When comparing the answers provided before and after the learning event, it's clear that participants now understand the topics better, especially when it comes to eating a healthy diet and knowing which foods are high in sugar, salt, and fat. This change suggests that the learning sessions were successful in helping people quickly learn new information and clear up things they didn't understand before.

The main goal of the before-and-after assessment was to act as a tool for checking how well people were learning right away, instead of being a strict way to measure how effective the intervention was. The improvement seen in the answers after the activity shows that participants were actively involved in the learning process and could remember and use the main points that were taught during the sessions. Looking at it from the view of involving the community, these results show that the program's content was easy to understand,

meaningful, and well-suited to the participants' lives.

The mean score increased from 74.27 before the activity to 89.93 after the activity, with the median score improving from 70 to 100 (Figure 1). This increase reflects improved short-term understanding following participation in the educational activity and serves as supporting documentation of learning outcomes rather than a primary indicator of program success. The paired t-test showed a statistically significant difference between pre- and post-activity scores ($p = 7.17 \times 10^{-22}$); It is important to note that the before-and-after results are seen as evidence that the learning activity was successful in teaching people new things, rather than as solid proof that people will change their behavior or that there will be a lasting impact. As is typical with community education programs, this evaluation focuses on recording how people learn and how they respond, which is an essential first step for later interventions that aim to change behavior or have long-term effects.

More importantly, the implementation process highlighted strong collaboration between the program team, teachers, and PMR members as key community partners. PMR members played an active role in organizing students, assisting with health screening activities, and facilitating peer discussions. This collaborative approach strengthened student participation and created a learning environment that encouraged dialogue and shared reflection. During the sessions, students actively discussed their daily food and beverage choices and asked practical questions related to sugar, salt, and fat consumption, indicating increased awareness and relevance of the educational content.

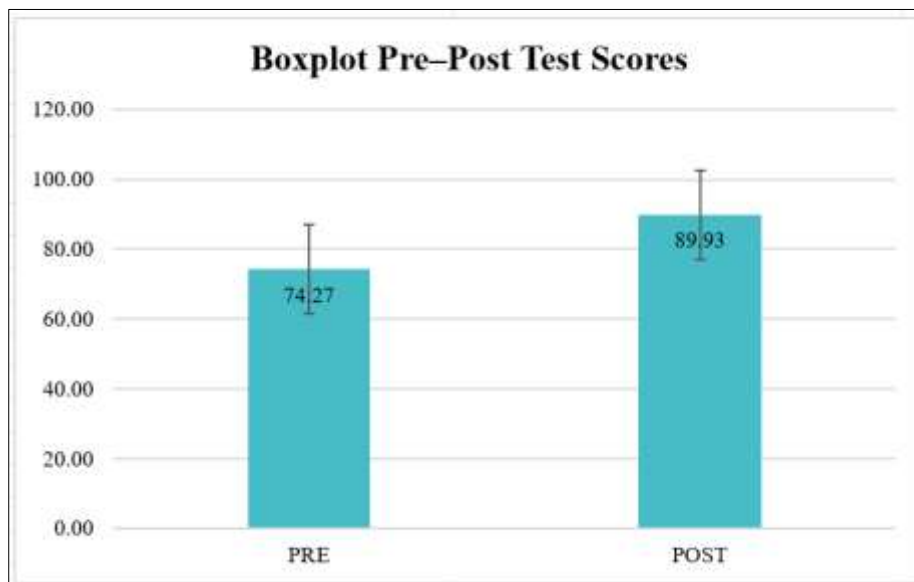


Figure 1. Boxplot pre-post test scores

From a community service perspective, these observations align with previous findings that school-based nutrition education can support adolescents' understanding when delivered through interactive and contextually relevant approaches [16,19]. The use of group discussions and question-and-answer sessions fostered active engagement and peer learning, which are essential elements of empowerment-oriented community programs [18,20]. Incorporating examples of foods commonly consumed by students further enhanced comprehension and helped translate nutrition messages into everyday practice [21,22]. Providing clear information on recommended SSF intake thresholds allowed students to relate the educational content to their own dietary habits and school environment [19,23]. Nevertheless, because the evaluation was conducted immediately after the activity, the observed improvement may partly reflect short-term recall. This underscores the importance of follow-up activities and ongoing reinforcement through school health programs to support sustained learning and potential behavioral change [17,24].



Figure 2. Health screening activity (Left) Interactive group discussion (Right)



Figure 3. Student-facilitator interaction (Left) Reflective activity (Right)

The observations further illustrate the implementation process and social impact of the activity. Students participated in basic health screening, including height and weight measurement followed by body mass index calculation. This process increased students' awareness of their nutritional status and provided a concrete entry point for discussing the relationship between daily dietary habits and health outcomes. It is important to emphasize that the body mass index assessment conducted in this activity was intended solely as an educational and awareness-raising tool, rather than as a clinical diagnostic procedure. The health screening activity also helped students connect the educational messages on sugar, salt, and fat intake with their own physical condition (Figure 2).

Interactions between students and facilitators, along with reflective discussions, further strengthened the learning experience. Facilitators provided guidance and clarification regarding healthy dietary practices, while reflective activities encouraged students to evaluate their personal eating habits and identify feasible steps toward healthier choices (Figure 3). Although the activity was limited in duration, the integration of health screening, interactive discussion, and reflection supported student engagement and reinforced short-term understanding, demonstrating the potential of school-based community engagement programs to improve adolescent nutrition literacy.

Based on the results of the activities, school partners benefited from improved student understanding and health promotion in the school environment. The increase in knowledge scores after the activities showed that school-based nutrition education with an interactive approach can help improve adolescents' understanding of

limiting sugar, salt, and fat consumption. The involvement of PMR members in the implementation of activities shows that PMR has the potential to play a role in supporting health promotion activities in schools. Group discussions and interactions between PMR members and facilitators provided a space to convey views and questions related to daily consumption habits, making the educational material more contextual.

The implementation of simple health screenings, such as body mass index measurements, helped students relate the information they obtained to their own conditions. Students were explicitly informed that the BMI results were not used to label individual health status or diagnose nutritional problems, but to facilitate learning and reflection on general nutritional categories and healthy lifestyle practices. Based on these results, school partners were advised to consider gradually integrating nutrition education into UKS (School's Health Clinic) or PMR activities, carry out educational activities periodically in accordance with the school's capacity, and establish cooperation with health institutions or universities in an effort to support the sustainability of health promotion activities in the school environment. This community engagement program provides short-term benefits in the form of increased knowledge and a quick overview of nutritional status through BMI checks. The use of BMI assessment in this context should therefore be understood as part of a health education strategy, supporting self-awareness and motivation rather than serving as a medical evaluation. In the long term, this activity has the potential to increase teenagers' motivation to choose healthy foods, be physically active, manage stress well, and get regular rest.

1. CONCLUSION

This school-based nutrition education program shows that using an interactive and community-involving method is possible and works well in helping teenagers better understand the recommended amounts of sugar, salt, and fat they should consume. The observed rise in knowledge scores, along with active student involvement and reflection, suggests that contextualized nutrition education can increase awareness and make healthy dietary messages more relevant within the school environment. The participation of Youth Red Cross (PMR) members as peer facilitators further strengthened engagement and highlighted their potential role as agents of health promotion among adolescents.

Although the program was limited to a single-session intervention with immediate post-evaluation, the findings suggest that integrating interactive education, peer involvement, and simple health screening activities can support nutrition literacy and self-awareness among students. However, we cannot make firm conclusions about how well knowledge is remembered over time, whether behaviors actually change, or if there are long-term benefits for health because the follow-up period was too short and there was no comparison group.

Overall, this initiative offers a useful starting point for promoting nutrition among teenagers in schools and provides a model that can be used in existing UKS or PMR activities. Future programs should focus on repeated sessions, long-term evaluation, and behavioral indicators to enhance the evidence of their impact and support the development of sustainable healthy lifestyle practices among adolescents.

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REFERENCE

- [1] N. Pearson *et al.*, “The Effectiveness of Combined Dietary and Physical Activity Interventions for Improving Dietary Behaviors, Physical Activity, and Adiposity Outcomes in Adolescents Globally: A Systematic Review and Meta-Analysis,” *Obesity Reviews*, vol. 26, no. 9, p. e13940, Sep. 2025, doi: <https://doi.org/10.1111/OBR.13940>.
- [2] WHO, “Obesity and Overweight,” 8, December 2025. Accessed: Jan. 16, 2026. [Online]. Available: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>.
- [3] UNICEF Indonesia, “Analisis Lanskap Kelebihan Berat Badan dan Obesitas di Indonesia,” Unicef, pp. 1–113, 2022, [Online]. Available: <https://www.unicef.org/indonesia/media/15581/file/AnalisisLanskapKelebihanBeratBadandanObesitasdiIndonesia.pdf>.
- [4] E. Masri, N. S. Nasution, and R. Ahriyasna, “Literasi Gizi dan Konsumsi Gula, Garam, Lemak pada Remaja di Kota Padang,” *J. Kesehat.*, vol. 10, no. 1, pp. 23–30, 2022, doi: <https://doi.org/10.25047/jkes.v10i1.284>.
- [5] W. M. Ginting, E. Purba, J. Manurung “Edukasi Pendidikan Gizi Dengan Kejadian Obesitas Pada Siswa MTS. Nurul Ittihadiyah Lubuk Pakam,” *Jurnal Pengabdian*, vol. 1, no. 1, pp. 14–20, 2024, [Online]. Available: <https://ejournal.pans.or.id/index.php/abdimas/article/view/10>
- [6] D. E. Suza, V. Miristia, and H. Hariati, “Physical activities and incidence of obesity among adolescent in Medan, Indonesia,” *Open Access Maced. J. Med. Sci.*, vol. 8, no. 4, pp. 198–203, 2020, doi: <https://doi.org/10.3889/oamjms.2020.4225>.
- [7] M. Reza, D. Saputra, N. Humaira, I. Idris, and Muhammad, “Edukasi Gizi Olahraga Berbasis Digital untuk Remaja Aktif di Lingkungan Sekolah,” *Aksi Kita: Jurnal Pengabdian kepada Masyarakat*, vol. 1, no. 4, pp. 420–427, Jul. 2025, doi: <https://doi.org/10.63822/V239V313>.
- [8] N. Samad, L. Bearne, F. M. Noor, F. Akter, and D. Parmar, “School-based healthy eating interventions for adolescents aged 10–19 years: an umbrella review,” *International Journal of Behavioral Nutrition and Physical Activity* 2024 21:1, vol. 21, no. 1, pp. 117–, Oct. 2024, doi: <https://doi.org/10.1186/S12966-024-01668-6>.
- [9] A. Adzika, M. I. Kartasurya, and Z. Shaluhiah, “Models of Nutrition Education Interventions for Adolescent Lifestyle Changes: a Scoping Review,” *Media Penelitian dan Pengembangan Kesehatan*, vol. 35, no. 4, pp. 1314–1326, 2025, doi: <https://doi.org/10.34011/jmp2k.v35i4.3242>.
- [10] I. Dwijayanti, F. Ningsih, A. R. Pramoedyo, B. A. Khabibah, R. N. Febrianti, and Z. D. Azza, “Edukasi Pentingnya Gizi Seimbang dan Aktivitas Fisik pada Remaja Putri di Masa Pandemi COVID-19: Education on the Importance of Balanced Nutrition and Physical Activity among Young Women during the COVID-19 Pandemic,” *Poltekita: Jurnal Pengabdian Masyarakat*, vol. 3, no. 2, pp. 286–292, Jun. 2022, doi: <https://doi.org/10.33860/PJPM.V3I2.886>.
- [11] H. H, “Edukasi Pola Makan Sehat dan Air Minum Berkualitas Pada Siswa SMK I Kasari Pekanbaru,” *Humanism: Jurnal Pengabdian Masyarakat*, vol. 1, no. 2, pp. 49–56, 2020, doi: <https://doi.org/10.30651/hm.v1i2.5590>.
- [12] M. Jaelani, M. D. Larasati, and D. L. P. Muningsgar, “Edukasi Gizi Konsumsi Sayur dan Buah Untuk Pencegahan Obesitas Remaja Kelurahan Pedurungan Tengah Semarang,” *Jurnal Pengabdian Masyarakat Indonesia*, vol. 5, no. 2, pp. 355–363, 2025, doi: <https://doi.org/10.52436/1.jpmi.3421>.
- [13] Y. Maidelwita and Y. Arifin, “Edukasi Kesehatan Tentang Gizi Seimbang Dalam Upaya Peningkatan Pengetahuan Pada Remaja Pesantren Ramadhan,” *Edukasi Kesehatan Tentang Gizi Seimbang Dalam Upaya Peningkatan Pengetahuan Pada Remaja Pesantren Ramadhan*, vol. 1, no. 6, pp. 710–715, 2023.
- [14] T. Muzenda, M. Kamkuemah, J. Battersby, and T. Oni, “Assessing adolescent diet and physical activity behaviour, knowledge and awareness in low- and middle-income countries: a systematised review of quantitative epidemiological tools,” *BMC Public Health*, vol. 22, no. 1, pp. 1–13, 2022, doi: <https://doi.org/10.1186/s12889-022-13160-6>.

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- [15] D. N. Sari, D. Hilmanto, D. K. Sunjaya, and P. Sari, "Community-based interventions to improve adolescent nutrition: a scoping review," *BMC Public Health*, vol. 25, no. 1, p. 4394, Dec. 2025, doi: <https://doi.org/10.1186/S12889-025-25617-5>.
- [16] A. Hisbullah Amrinanto, M. Guntur Sunarjo Putra, L. Wira Liesma Djati, P. Dwi Rahayu, and S. Tinggi Ilmu Kesehatan Bogor Husada, "Edukasi Pembatasan Konsumsi Gula Garam Lemak Pada Remaja Di Smk Kusuma Wardhana Kota Bogor," *J. Pengabd. Gizi dan Kesehat. Masy.*, vol. 3, no. 1, p. 2025, 2025, doi: <https://doi.org/10.53823/jpgkm.v3i1.131>.
- [17] S. K. Thapa, R. R. Bhandari, and A. Shrestha, "Effect of nutrition education intervention on nutrition knowledge, attitude, and diet quality among school-going adolescents: A quasi-experimental study," *BMC Nutrition*, vol. 10, Art. no. 35, 2024, doi: <https://doi.org/10.1186/s40795-024-00850-0>.
- [18] A. Amiroh, P. Dwiyana, and S. Mardiyah, "Nutrition education on low sugar, salt, and fat consumption patterns among adolescents," *Community Empowerment*, vol. 6, no. 4, pp. 595-601, 2021, doi: <https://doi.org/10.31603/ce.4600>.
- [19] A. H. Amrinanto *et al.*, "Education on limiting sugar, salt, and fat consumption among adolescents," *Jurnal Pengabdian Gizi dan Kesehatan Masyarakat Indonesia*, vol. 3, no. 1, pp. 162-168, 2025.
- [20] I. R. Contento, *Nutrition Education: Linking Research, Theory, and Practice*, 3rd ed. Burlington, MA, USA: Jones & Bartlett Learning, 2016.
- [21] N. Gifari *et al.*, "The association between nutrition knowledge and dietary behavior among adolescents," *Ilmu Gizi Indonesia*, vol. 7, no. 2, pp. 193-201, 2024, doi: <https://doi.org/10.35842/ilgi.v7i2.425>.
- [22] H. Hafiza, A. Utmi, and S. Niriyah, "Eating habits and nutritional status among adolescents," *Al-Asalmiya Nursing Journal*, vol. 9, no. 2, pp. 86-96, 2021.
- [23] Atmarita, A. B. Jahari, S. Sudikno, and M. Soekatri, "Sugar, salt, and fat intake in Indonesia," *Gizi Indonesia*, vol. 39, no. 1, pp. 1-14, 2017.
- [24] D. D. Fahrizki and C. M. Dwiriani, "Digital-based nutrition education on nutrition knowledge and behaviors in adolescents: A systematic review," *BIO Web of Conferences*, vol. 153, 2025, doi: <https://doi.org/10.1051/bioconf/202515302009>.